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Worldwide Report

NUCLEAR DEVELOPMENT AND PROLIFERATION

No. 149



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23 June 1982

WORLDWIDE REPORT
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INTERREGIONAL URANIUM EXPLORATION MEETING HELD IN MADAGASCAR

Tananarive MADAGASCAR-MATIN in French 20 Apr 82 pp 1-2

[Text] An interregional uranium exploration meeting, which opened yesterday and continues through 28 May 1982, is being held successively in Tananarive, Fort-Dauphin and Antsirabe.

Delegates from Afghanistan, Ivory Coast, Egypt, Indonesia, Cameroon, Yugoslavia, Romania, Tunisia, Niger, Vietnam, Mali, Gabon, Algeria, Morocco, Argentina, Poland, Canada, Great Britain, Libya, France, Austria and, of course, Madagascar are participating in this meeting, which opened officially yesterday morning in the Madagascar-Hilton Hotel. Among the attendees were Mr Stipanivic, representative of the director general of the International Atomic Energy Agency [IAEA], headquartered in Vienna, Austria; Col Humbert Andrianasolo-Ralamiza, director general of the National Military Office for Strategic Industries (OMNIS); and Mr Teunissen, resident UN representative in Tananarive. Also present were representatives of the diplomatic corps (U.S.A., European Development Fund, Algeria, Central Fund for Economic Cooperation and Yugoslavia).

Eagerness

Let us take note of the fact that this meeting was jointly organized by the Democratic Republic of Madagascar (through OMNIS) and IAEA. Madagascar, by consenting to hold such a meeting in its country, once again demonstrated its eagerness to work for world development. As so brilliantly underscored yesterday by Col Hubert Andrianasolo, uranium is being called upon to constitute the third industrial revolution. And it is known that our substrata contain this precious ore. In his speech, Stipanivic emphasized in particular the full readiness of his agency to assist all countries that have uranium ore to mine it efficiently, especially developing countries. To this end, the agency makes available to them experts, equipment, foreign scholarships and, as at present, on-site training courses. Nuclear energy in the service of peace and development was also the backdrop for the brief speech delivered on this occasion by Stipanivic.

As we have stated, Col Humbert Andrianasolo's speech yesterday was noteworthy, principally as regards the role of "nuclear energy" in the life of man from now to the end of the 20th century. Therefore, the holding of this meeting in Madagascar, as it was put by the director general of OMNIS, in the "crowning achievement of the patient efforts that have permitted us to make known the important role that the Democratic Republic of Madagascar can play in the concert of nations for the development of nuclear science and, most particularly, nuclear energy. The universality of assistance, the quality and high competence of the participants and conferees cannot fail to encourage us in our effort and prompt us "to forge even further ahead."

Last Quarter of the Century

Yesterday the principal topic was the "nuclear source of energy." In this last quarter of the 20th century, "nuclear energy" is to occupy a preferred position in mining, agricultural and medical research and the supply of energy. As we all know, the first "industrial revolution" was the result of coal, the second derived from oil and hydroelectricity with the possibility of widespread electrification. We are increasingly of the opinion that the "third revolution" before the end of this century will be produced by nuclear energy. Thus, Col Hubert Andrianasolo-Ralaimiza very properly said yesterday that the development of energy sources is a "development-generating industry because it is an industrializing industry."

He gave particular emphasis to the even greater importance of energy in the developing countries. There is no need to comment on this point; it is public, indeed international, knowledge. However, the figures cited by the director general of OMNIS are mind-boggling just the same. And it would be good to take note of them. Most of the world's energy production is consumed by the developed countries. Representing only 30 percent of world population, these countries now consume over 80 percent of the world's commercial energy, while 70 percent of the world's population living in the developing countries consume less than 20 percent. Other figures cited: the needs of the developing countries in the implementation of the necessary energy infrastructure are estimated at over US \$800 billion.

Efficiency

Nevertheless, when the developing countries have energy available, they must use their resources efficiently. The problems of the developed countries are not the same because they have the financial and technological resources. This leads to the construction of nuclear power plants here and there in those self-same developed countries. This regardless of the danger to which they are exposing themselves (possible diversion of raw materials for military or terrorist purposes, risks of radioactive fallout...)

The Third World, of course, has not reached that point. But once developed efficiently, the uranium found in these very countries is destined to positively "revolutionize" their economic and social situation, which today is generally precarious.

As for Madagascar specifically, in 1922 a great French minerologist, Alfred Lacroix, published a memorable book on the mineralogy of Madagascar and revealed to the world the potential contained in the Malagasy substrata. After years of effort, interrupted by World War II, on 5 February 1953 the first "uranium leaching plant" of what at that time was called the French Union was opened in Madagascar. Marcel Roubault, chairman of the Mines Committee of the Atomic Energy Commission (CEA), who came to Madagascar on that occasion, said: "The peaceful use of atomic energy will certainly be perfected in 10 years, at which time a kilogram of uranium will replace 10 tons of coal. Atomic energy will be for these overseas territories an incomparable means of development." Although his estimate for a kilogram of uranium has been largely exceeded, on the other hand the second part of his forecast remains to be realized.

Uranium and Oil

That is why President Didier Ratsiraka has now placed the development of Malagasy uranium among his so-called "presidential" projects. Where? When? How? An ideal opportunity is now present to speak of this publicly. We intend to return to this topic.

In the world, the idea is spreading that uranium can take care of the post-oil period. We have uranium. Oil? There is more and more talk of developing the sandstone of Bemolanga. And conventional oil, too. Heavy drilling equipment for this purpose from the American Mobil Oil Company arrived in Toamasina last week and will gradually be sent to the site. In other words, Madagascar's future looks bright. While we await an international meeting of the kind being held now, this interregional uranium exploration meeting (OMNIS-IAEA) will help us to better prepare for that future!

8143

CSO: 5100/5650

FINLAND STUDYING PURCHASE OF REACTOR FROM USSR OR FRANCE

Helsinki HELSINGIN SANOMAT in Finnish 30 Apr 82 p 22

[Text] In case nuclear power is chosen as a future power source in Finland, Imatran Voima is, according to managing director Pentti Alajoki, more interested in an alternative consisting of two units of the present kind, rather than a large 1,000-megawatt power plant.

Alajoki predicts that the decision to order or not to order nuclear reactors will not be made until after the fall parliamentary elections. Alajoki assumes that the results of the current studies will not be made public before the elections.

Imatran Voima has contracts for suitability tests of nuclear reactors with both Soviet and French suppliers. The studies are to be completed by the fall.

The alternatives for Finland's nuclear reactor that have been presented are either two 500-megawatt reactors or one 1,000-megawatt reactor. Alajoki states that the latter still involves certain "crucial questions" that it might be hard to reach mutual agreement about with the authorities who control the reactors.

In regard to the safety standards of the French reactors, Alajoki is of the opinion that these are somewhat lower than what is required in Finland. This may weaken their chances when the choice is made.

The possibilities that the French suppliers present for the storage of spent fuel would not be as extensive, for example, as the current practice at the Imatran Voima plants, from which spent fuel is transported to the Soviet Union. The French offer the possibility of storing the spent fuel for only a limited period.

According to Alajoki, there is reason to not completely forget the Swedish alternative.

By current estimates, Finland will need an increased capacity for electricity production by the early 1990's. It is necessary, because of the long

construction time, to decide within a year whether or not this energy should be produced with nuclear power. Among the alternatives to nuclear power, the construction of a large coal plant is also being studied.

9662

CSO: 5100/2160

UNION ANTI-NUCLEAR POLICIES SPREAD TO INCLUDE U.S. WARSHIPS

Brisbane Activities

Brisbane THE COURIER-MAIL in English 24 Apr 82 p 4

[Text] Queensland Trades and Labor Council unions will call a 24-hour protest strike when the American nuclear warship Truxtun berths in Brisbane.

The ship's expected arrival in Queensland waters next Thursday will trigger off action by all unions in the Brisbane metropolitan area able to take part in the strike.

All ~~commuter~~ transport, telephone repairs, garbage collection and a wide variety of other services could be affected.

Essential services will be exempt, but the Trades and Labor Council does not view public transport as an essential service.

As the Australian Railways Union--the union with the most members and widest coverage in the railway system--has a strong anti-uranium policy, it is expected to halt rail services for the 24 hours.

The Australian Telecommunication Employees Association also has an active anti-uranium and anti-nuclear policy which means its members also are strong contenders to join the stoppage.

All other TLC unions have policies which oppose uranium mining, uranium enrichment and nuclear power.

The Queensland Trades and Labor Council secretary Mr Whitby, said the unions decided yesterday morning to hold the stoppage and place Fisherman Islands--at the mouth of the Brisbane River, where the ship will berth--out of bounds during its visit.

"The nature of the recommendation will not be announced prior to the mass meeting," he said. "It was also reported that the Brisbane branch of the Waterside Workers Federation has decided to hold a 24-hour stoppage and no work will be performed in the vicinity of the Truxtun."

he said: "The Waterside Workers' Federation will announce the date of the 24-hour stoppage as soon as it has been fixed.

"This ship is now expected to arrive next Thursday, and because of its size will have to come in on the high tide. It is expected to be in Brisbane for up to nine days."

The unions would also be demonstrating their antagonism to the Truxtun's presence with placards during the Labor Day procession.

Mr Whitby said that what the unions wanted was for members to await the announcement of the date the Truxtun would arrive and then organise all protest stoppages to go off simultaneously.

A Peace Force researcher, Mr Mark Hayes, said the Truxtun's visit to Brisbane next week should be the cause of great concern.

"If it were a Soviet warship, a British warship or anybody else's warship, Peace Force's opposition would be exactly the same.

"In line with peaceful people throughout the world, and particularly the Pacific Ocean, we are opposed to this terrible nuclear arms race of death.

"Peace Force will organise a number of peaceful non-violent and lawful protests to the Truxtun's visit," he said.

Plea for Financial Support

Melbourne THE AGE in English 29 Apr 82 p 6

[Article by Peter Stephens]

[Text]

An ACTU working party has agreed to ask unions to support financially the ACTU's anti-uranium policy.

Its proposal asks unions to finance industrial action taken in support of the policy.

The proposal, which will be considered by the ACTU executive in Brisbane next month, seeks to overcome the main problem in the policy — implementing the opposition in principle to the mining and export of uranium.

Since the ACTU adopted a firm anti-uranium stand at the 1979 congress, it has been unable even to stop union mem-

bers working in the industry, let alone prevent the industry functioning.

The working party meeting in Sydney on Monday was attended by only 13 of the 27 unions in the industry.

Its main decisions were to:

- Reaffirm the position opposing uranium mining by maintaining a publicity campaign and pressure on the Federal Government.

- Seek the views of unions on whether or not they would contribute to a fund to be used either for a big publicity campaign or to sustain union taking industrial action in support of the policy.

NEW LIBERAL OPPOSITION LEADER SUPPORTS NUCLEAR POWER

Canberra THE AUSTRALIAN in English 22 Apr 82 p 1

[Article by Jivan Prabhakar: "Dowd Pledges Nuclear Power for NSW"]

[Text]

NSW would have nuclear power stations under a Liberal Government, the Leader of the Opposition, Mr Dowd, announced yesterday.

Mr Dowd told a press conference that unless NSW was generating nuclear power at the turn of the century, it would fall behind the rest of the world.

Mr Dowd left last night for a three-week overseas study tour, saying he intends to visit a nuclear power station in the United States "because we may in fact have to accelerate looking at nuclear energy for NSW".

He said his support for nuclear power was based on the proposition that the State had "only a decade or so" of economical coal development ahead.

"We are making decisions now based on coal-fired power stations which, if they're going to be amortised over 30 or 40 years, which is maybe the life of a power station, may go beyond their economic viability point," Mr Dowd said.

A Liberal Government would continue to use coal-fired stations "for the next decade or so", but they could not be justified indefinitely.

"These things (nuclear power stations) take 20 years

to plan, establish and develop. I don't want to be in a position by the year 2000 not to have any technology and preparation for nuclear energy if that is the only technology available."

The former chairman of the Australian Atomic Energy Commission, Sir Phillip Baxter, yesterday described Mr Dowd's statements as politically courageous and absolutely right.

He claimed that unless Australia accepted nuclear power it would become a Third World country behind Pakistan, India and even Bangladesh, which had already decided to build reactors for power generation.

A spokesman for the Premier said last night that Joint Coal Board figures indicated proven recoverable reserves of coal in NSW were 12.1 billion tonnes — only a fraction of total resources — which at present production rates would last for 200 years.

The Energy Minister, Mr Landa, last night described Mr Dowd's remarks as "rubbish".

"All the indications are that nuclear energy is proving more and more economically non-viable, not to mention the social consequences that have not been grappled with, such as wastes and the general fears of the public," he said.

SA PREMIER HITS LABOR PARTY THREAT TO URANIUM INDUSTRY

Brisbane THE COURIER-MAIL in English 5 May 82 p 32

[Text]

CANBERRA.—South Australian Premier Mr David Tonkin warned last night Australia would be "a laughing stock" in the international community if a future Labor Government in Canberra were to repudiate uranium sales contracts.

Mr Tonkin gave the warning at the 1982 minerals outlook seminar, held by the Australian Mining Industry Council in Canberra.

He said his government recognised the mining industry's need for certainty in government policy.

Labor's proposals for a resource rent tax and "continuing suggestions" that a Federal Labor Government would repudiate uranium sales contracts represented "the antithesis of the certainty on which we all place so much importance".

"Such proposals dwarf any difficulties that may have arisen from, say, changes in depreciation allowances," he said.

"Repudiation of uranium sales contracts too—particularly as these have been negotiated within the framework of bilateral safeguards agreements between Australia and foreign governments—would make Australia a laughing stock within the international community."

AMIC president Mr Hugh Morgan told the seminar Australia's mining industry was in danger of losing its competitive edge.

Short-term thinking had come to dominate government decision-making at all levels. There had been more than 30 changes to mining tax laws since 1974 and this had made forward planning of development projects virtually impossible.

"As a result of international conditions, the exchange rate, and our performance as a nation, the industry is in danger of losing its competitive edge," Mr Morgan said.

He said there had been a serious and rapid decline in mining profits last year and there was no sign of an early recovery.

LABOR GOVERNMENT COULD HALT URANIUM MINING WITHOUT COMPENSATION

Brisbane THE COURIER-MAIL in English 8 May 82 p 3

[Text]

A federal Labor government would have the power to halt uranium mining and export without paying compensation to mining companies.

This advice was given in a specially commissioned legal report presented to the party's national executive yesterday.

The advice, presented by the party's legal and constitutional committee and based on the opinion of constitutional and mining law experts, appears to give the Labor Party solid legal backing to implement its anti-uranium policy.

The Opposition spokesman for Justice Senator Gareth Evans told the national executive meeting in Sydney a Labor government could terminate uranium agreements without being liable for compensation under Australian or international law.

Mr Hawke, when president of the Australian Council of Trade Unions, favored a policy of permitting uranium development. He said any other policy was unrealistic.

However, the announcement yesterday was welcomed by his ACTU successor, Mr Cliff Dolan who is the leader of trade union opposition to uranium development.

Mr Dolan described the report last night as "very significant and heartening news."

"The ALP policy is very similar to ACTU policy in that it called for a complete moratorium of uranium mining and we would have expected that a Labor government next year would at least refuse any further export licences for any future mines.

"If they can stop present mines operating without being required to pay compensation, well that is very heartening indeed."

Labour's national secretary Mr Bob McMullan said the executive accepted the committee's report as being legally valid.

He said the executive had established a sub-committee to review the social, economic and financial implications of the ALP's uranium policy.

The sub-committee would report to the next executive meeting in July prior to the national conference which determined party policy, he said.

The sub-committee was composed of the national officers, the leader and deputy leader and the secretaries of the Victorian and NSW branches.

Mr Dolan and the ACTU secretary, Mr Peter Nolan, would be asked to join the committee.

Mr McMullan said the committee could not make policy recommendations.

The executive also resolved that the next senior vacancy in the party's national secretariat would be filled by a woman.

Mr McMullan said that following a state branch review the executive resolved that it could not at present fund the position of a female assistant national secretary.

But the executive had adopted a recommendation from the national status of women policy committee that a woman be appointed to the next senior secretariat position which became vacant.

He said it was certain that this would happen this year and would coincide with a general staff review of the secretariat.

AUSTRALIA

BRIEFS

FREMANTLE NUCLEAR PROTEST--Fremantle will be the centre of a demonstration against nuclear power today--three days after signs were erected on the city boundaries declaring it a nuclear free zone. The Campaign Against Nuclear Energy will hold a peaceful protest outside the Fremantle town hall over a visit by the commander in chief of the American Pacific fleet, Admiral James Watkins. Admiral Watkins will attend a council reception as part of his visit to WA to commemorate the Battle of the Coral Sea. At least one Fremantle councillor will be among the protesters outside the hall. Cr Gerry MacGill said yesterday that he would attend the demonstration as a private individual to show his concern at the presence of nuclear-armed vessels in the Indian Ocean. [Perth THE WEST AUSTRALIAN in English 4 May 82 p 34]

ANTINUCLEAR PETITION--Almost 400,000 Australians have signed a petition calling for the abolition of nuclear weapons. This was announced at a ceremony at Parliament House, Canberra, yesterday by the president of the United Nations Association of Australia, Mrs Cecile Storey. She said an overwhelming number of people wanted to abolish nuclear weapons and all weapons of mass destruction. "Australians also want world-wide conventional weapon disarmament in stages," she said. Mrs Storey was announcing the results of the World Disarmament Campaign Petition, sponsored by the association. She said 376,427 people had signed the petition, which would be presented, with millions of signatures from all over the world, to the Second United Nations Special Session on Disarmament in New York on June 10. The petition was addressed to all governments and the UN special session. Its four points were agreed to by all nations, including Australia, at the first UN Special Session on Disarmament in 1978. They call for the abolition of nuclear weapons and all weapons of mass destruction. [Canberra THE AUSTRALIAN in English 5 May 82 p 2]

CALL FOR N-POWER REJECTION--CANBERRA--The Opposition called yesterday for a Federal Government commitment that nuclear power was not being considered as a serious option for power-generation in Australia. Labor's environment and conservation spokesman, Mr West, asked the Prime Minister, Mr Fraser, for the statement following the release of the national energy advisory committee report "Nuclear power in Australia: regulation and control." "Does it suggest that nuclear power is an energy option for South Australia, Western Australia, Tasmania and the Northern Territory?" Mr West asked. Mr Fraser said talks were under way aimed at getting a uniform code, but there was no proposal before the government. He said there had been an earlier proposal by Western Australia for a possible nuclear powerstation by 1990-95. [Brisbane THE COURIER-MAIL in English 7 May 82 p 10]

RANGER URANIUM OUTPUT--Energy Resources of Australia Ltd's Ranger uranium project at Jabiru operated at about 95 per cent of stated capacity in the March quarter with an output of 715.7 tonnes of uranium oxide. The output was 61.1 tonnes down on December quarter production of 776.8 tonnes--representing more than 103 per cent of capacity--but ERA is still confident that the 1982 target of 3,000 tonnes will be reached. "We are now back on plan with output running at slightly above rated capacity," a spokesman said yesterday. The Ranger project "drummed" its first uranium oxide product on August 13 last year and by the end of 1981 had produced 1,122.2 tonnes. Output up to the end of March of 1,837.9 tonnes should be lifted to at least 2,600 tonnes for the company's first year of operation ending on June 30. In its December half-year, it reported a net profit of \$7.73 million on sales of \$36.6 million. [By J.N. Pierce] [Text] [Sydney THE SYDNEY MORNING HERALD in English 21 Apr 82 p 26]

URANIUM MINE SHUTDOWN--Melbourne.--The board of Mary Kathleen Uranium expects the company, for a long time Australia's only uranium producer, to be wound up before the end of 1983, it announced yesterday. The chairman of MKU, Mr J.L. Liebelt, told yesterday's annual meeting that directors expected the company to be wound up when sales commitments and rehabilitation of the mine site was completed. Once plant and equipment had been sold and the cost of rehabilitation more accurately assessed, consideration would be given to a partial return of capital before the company was wound up. Mr Liebelt said the low grade of the MKU deposit made it costly to produce uranium oxide. Together with the weak uranium market, this made operations uneconomic. Despite spending about \$15 million in 1982 dollars the company had been unable to locate any extension to the MKU ore and no discoveries had been made outside Mary Kathleen. All exploration activity by the company had been discontinued, he said. Mr Liebelt said production for 1982 was expected to be slightly higher than in 1981, with sales lower. By the end of the year stocks should be sufficient to cover remaining sales commitments due for delivery in 1983 and 1984, he said. [By Stephen Bartholomeusz] [Excerpts] [Sydney THE SYDNEY MORNING HERALD in English 24 Apr 82 p 32]

CSO: 5100/7531

MARTIAL LAW OFFICIAL ADDRESSES ATOMIC ENERGY COMMISSION

Dacca THE NEW NATION in English 13 May 82 pp 1, 8

[Text]

Air Vice-Marshal Sultan Mahmud, Deputy Chief Martial Law Administrator and Adviser for Energy and Mineral Resources yesterday stressed the importance of people-oriented research by peaceful uses of the atomic energy, reports BSS.

Addressing the scientists and officials of the Bangladesh Atomic Energy Commission here, the DCMLA called upon the scientists to innovate newer ways to utilise the nuclear power in the field of applied sciences for the benefit of the commonmen.

Air Vice-Marshal Sultan Mahmud visited the Atomic Energy Commission compound and went round the different laboratories and other sections of the Commission. The Chairman of the Commission Dr. Anwar Hossain and senior officials were present on the occasion.

Describing electricity as an essential pre requisite for any industrial development, the DCMLA said that the deficiency of power particularly in the Western Grid had put up enormous obstacles in agriculture, industry and other sectors. He said that the present government was undertaking various measures to enhance production of electricity. He

also disclosed that a final decision would be taken soon in respect of the Rooppur Nuclear Power Project.

Air Vice-Marshal Sultan expressed satisfaction at the progress of work on the 3-mw Research Reactor at Savar near Dacca. He appreciated the achievements attained by the Commission in the field of food storage, medicine sterilisation, disease detection, training in advanced computer and establishment of an electronic institute in the country.

The DCMLA urged the scientists and researchers to concentrate more on application of science for the benefit of commonmen. He advised them to give priority on such research projects which would give immediate return and would benefit larger number of people.

The Adviser for Energy said that the government was determined to remove the impediments on the way of adopting a proper administrative policy in respect of research work. He expressed his keen interest to exchange views on proper utilisation of science and technology for quick economic development of the country.

NOTE TO UN DISARMAMENT SESSION FAVORS NUCLEAR FREEZE

New Delhi PATRIOT in English 20 May 82 p 7

[Text]

INDIA favours a "freeze on nuclear weapons" consisting of two inseparable elements, namely, a complete cessation of the manufacture of nuclear weapons and a cut-off in the production of fissionable materials for weapon purposes, reports UNI.

A note that India has submitted for the month-long special session of the United Nations General Assembly devoted to disarmament, beginning from 9 June, says that such a combined step would mean that all nuclear facilities everywhere in the world would become peaceful.

And, in that event the nuclear-weapon states would not have any reason, excuse or pretext for refusing to accept international safeguards on their own nuclear energy establishment, which they are asking non-nuclear-weapon states to accept on theirs. In the name of so called full-scope (or complete nuclear fuel cycle, safeguards, it adds.

Also, in that event an effective and yet economical safeguards system could be devised on the basis of objective, scientific and non-discriminatory criteria, since it will be applicable to all states, it says.

In India's view, a freeze on nuclear weapons will greatly help in the prevention of nuclear war and will be an outstanding achievement of the special session.

It wants that the focus of the international community must remain on nuclear weapons. This basic consideration has guided India's principal initiatives, namely, in 1954, for the prohibition of all nuclear weapons tests,

in 1964, for stoppage of all proliferation of nuclear weapons — be it horizontal or vertical — and in 1978, for the prohibition of any use of nuclear weapons, pending nuclear disarmament.

In India's view, the second special session of the General Assembly will need to build on the final document of the first special session held in 1978. The adoption of the final document by consensus was a unique, significant and an unprecedented development, its note adds.

It says that the work of the forthcoming session will need to be organised as part of humanity's continuing quest for attaining the internally agreed goal of general and complete disarmament under effective international control with the highest priority being accorded to the objectives of nuclear disarmament and elimination of all kinds of weapons of destruction.

Since the existence of nuclear weapons poses a grave threat to the very survival of mankind, the note says world public opinion is increasingly veering to the view that the entire disarmament process leading to the cherished goal of general and complete disarmament would need to be completed within a fixed, short-time duration that should be agreed to in advance.

DEFENSE EXPERT URGES NUCLEAR POLICY REVIEW

New Delhi PATRIOT in English 13 May 82 p 10

[Text]

SELF RELIANCE in nuclear programme would depend on a thorough review of policy adopted so far, feels defence expert R R Subramaniam of the Institute of Defence Studies and Analyses.

Discussing India's nuclear programme and problems of self-reliance, organised under the aegis of Delhi Science Forum on Wednesday, Dr Subramaniam said the decision to rely mainly on imported enriched uranium for the nuclear plants at Tarapur, was only the beginning of the problem.

Initially, the nation's atomic energy programme between 1944 and 1960, had been set in the right perspective, but contradictions set in later.

From US point of view, the domestic legislation denying enriched uranium to dependent countries with retrospective effect put India in a difficult situation, Dr Subramaniam said. On the national front, the nuclear non-proliferation treaty was

a huge impediment.

The aid promised from the Soviet Union and France too was not forthcoming, Dr Subramaniam said, because of stringent conditions for nuclear safeguards.

With the country, the nuclear plants were nowhere near the targeted projections, with the heavy water plant at Baroda not producing "not more than a trickle", Talcher hounded by electricity problems, while the faulty adaptation of technology crippled the Kota plant, Dr Subramaniam said.

The proposal of setting up a fast breeder reactor complex with French assistance has been held up for a decade now, over wrangling on rates payable to France, while the enriched uranium for Tarapur project was delayed for hold-ups in transportation facilities.

On the whole, Dr Subramaniam felt that a comprehensive review of India's heavy water needs and production would help the planners.

CSO: 5100/7096

BRIEFS

'PEACEFUL PURPOSES' STAND REITERATED--ISLAMABAD, May 22--Pakistan's nuclear programme is peaceful and designed to help the economic development and well-being of the people. Commenting on the persistent Indian allegation that Pakistan wanted to develop nuclear capability to manufacture nuclear weapons, the knowledgeable sources pointed out that Pakistan has neither desire nor capability to manufacture nuclear weapons. It was also pointed out that Pakistan had taken a number of initiatives to remove fears, if any in this regard by offering India to have arrangements for bilateral or multilateral arrangements for inspection of nuclear facilities on reciprocal basis. Pakistan has also taken initiatives for the establishment of South-Asia nuclear weapon free zone. The Indian allegation in this regard against Pakistan had obviously ulterior motives. [Karachi MORNING NEWS in English 23 May 82 p 1]

CBO: 5100/5667

NUCLEAR POWER DEVELOPMENT, PROBLEMS DESCRIBED

Zarnowiec Nuclear Power Plant

Opole TRYBUNA OPOLSKA in Polish 19-20 Mar 82 p 3

[Article by Przemyslaw Kuciewicz: "Poland's 'Nuclear' Start"]

[Text] After 10 years of preparations, a decision was made a couple of weeks ago to go ahead immediately with the building of Poland's first nuclear power plant. It will be built in Zarnowiec on the Gdansk Coast. One billion zlotys are going to be spent on this site. In the course of an 8-year investment cycle, construction will absorb 45 billion zlotys.

Many people ask the question whether it pays for us to undertake such a costly investment right now at the nadir of our crisis and with unhappy prospects for the immediate future. This may be answered with another question: Can we afford prolonging indefinitely our energy deficit; and with no prospects for the future and the future impossible to foresee, are we equal to the exigencies of time? Furthermore, the way out of the crisis certainly is not going to be realized by abandoning all investments. This does not change the fact that the construction of the Zarnowiec nuclear power plant will be an important endeavor for our country. It is also a fact that this same result, i.e., an additional 1800 megawatts of power, could be attained more cheaply by building a comparable coal-fired electric power plant. This is true. But such a power plant would have to be supplied with over 5 million tons of coal annually. Though our coal reserves are not small, we cannot develop the coal-fired power industry forever. This coal has not only to be mined--it is getting to cost more and more--but it has to be transported. And in the case of Zarnowiec, all the way to other end of Poland.

Why Zarnowiec?

Why then the decision to have Poland's first "nuclear plant" built in Zarnowiec and not somewhere else? In the first place, it is a northern region with Gdansk as an urban center. This makes for all the greater the number of consumers of energy. While energy transmitted to Gdansk from central Poland causes losses of about 10 percent.

In the second place, the creation of a complex composed of two power plants has been planned a long time ago: A nuclear and pumped-storage electric power plant and a water-powered plant. Both of these would require an abundance of water--first, for cooling the turbines, second, for propelling them. Zarnowiec, as a projected site, situated on a large lake, fulfills these requirements perfectly. A pumped-storage electric power plant has been in existence for some time and is going to start supplying our country's grid in the first quarter of 1982. This power plant, however, will be fully effective only in tandem with a "nuclear power plant."

These then are the particular reasons for not delaying the decision to build the nuclear power plant. And we should get on with it before having completed work on the first part of the energy complex. Let us add that the building site, the equipment, and the cadre of construction power engineers are in place. Delaying this matter would seriously increase costs later on.

With a Friend's Help

Now let us pose still another question: Will we be able to build a nuclear power plant--do we have the available technological means and professional know-how to do something like this?

Although it does not take a genius to figure this out, it would be difficult for us to carry this out. Fortunately, we can take advantage of the Soviet Union's technical aid and wide experience. From it we receive, first of all, the basic installation--reactors. There will be four reactors of the WWR [pressurized water reactor] type with a unit power of 465 megawatts, just like the ones already in use in the USSR, Bulgaria, Czechoslovakia and those just now being installed in Hungary.

Our country's producers are supplying a significant majority of the remaining equipment (60 percent of the whole). The most important among this type of equipment would be the heat exchangers produced by "PAKOP," the industrial boiler factory in Sosnowiec. Let us add that we also export these kinds of equipment to the Soviet Union on the basis of shared work within the framework of CEMA. Among the suppliers of nuclear investment will be found "ZAMECH" Gen Karol Swierczewski Mechanical Plants at Elblag, a producer of turbines among other things. In the first phase of construction up to the year 1985, no free-foreign exchange imports are anticipated. We will see what happens later on. At any rate, we are taking pains so as to manage the best way we know how with what we have.

Failure--Once Every 10,000 Years

The development of nuclear power plants causes anxiety in significant sectors of society, which is manifested in some countries by stormy acts of protest. Specialists maintain that this anxiety is irrational.

To support their statement, they cite the fact that in the history of nuclear power plants, with 240 power plants existing in the world today, there has been only one major failure--and that was without any fatalities. On the other hand, just in coal mining alone, which is necessary for producing a corresponding quantity of energy, scores of miners are killed every year.

Experts tell us further that with existing safeguards, a major failure, such as a crack in a reactor's main pipeline, can happen once in 10,000 years according to the law of probability. At the same time, however, this must not be construed that no radioactive substances make their way into the atmosphere. In setting up safety conditions, all kinds of circumstances and factors are taken into consideration as far as the limit of their probability of occurring. For example, the probability of an earthquake or other natural disasters are taken into consideration. If jet aircraft come close to a nuclear power plant, the casing protecting the reactor must be so strong as to withstand a direct hit by a diving jet aircraft--otherwise there would be a catastrophe.

For the environment there obviously exists the long-range problem of storage or neutralization of radioactive waste. As yet no one has been able to deal with this problem in a completely satisfactory way on a world-wide scale, but science does not stand still.

On the other hand, there is bound to be a certain amount of trouble in the short-run over the natural environment of Zarnowiec. The problem is that the lake's waters will be heated. This will certainly cause accelerated growth of plant life and plankton. In order to prevent the lake from being grown over, it will be necessary to stock it with stenothermal and suitable voracious types of fish. And one will have to catch these fish and...fry them.

Nuclear Power Investments

Warsaw RZECZPOSPOLITA in Polish 22 Jan 82 p 3

[Article by Slawomir Popowski: "Our Stake in Nuclear Energy"]

[Text] (C) (PAP) The recently accepted Council of Ministers' resolution in the matter of constructing a nuclear power plant in Zarnowiec is for all intents and purposes the first big important investment decision of its kind undertaken under conditions of a deep crisis such as we are experiencing. This speaks very well of the authorities' efforts at solving not only current but future and structural problems.

According to the estimates of specialists, this resolution opens a new stage in the development of Poland's power industry. Our first nuclear power plant has been located on Lake Zarnowiec (Gdansk voivodship) and will be set up together with the pumped-storage electric power plant already in operation there--a compact complex so necessary in our country's northern regions. The total power of this nuclear power plant itself will amount to 1860 megawatts. It will operate on four power units installed in pressurized water reactors and have domestic turbine sets with a power of 465 megawatts each. In the first stage, there will be two types of power units installed there. It is calculated that unit investments costs (per 1 megawatt of power) amount to about 44.4 million zlotys. This, of course, will be about 10 million zlotys more than for the conventional hard-coal fired power plant (together with outlays for mine construction and railroad transportation costs), but, on the other hand, we will save on fuel. It is estimated that starting up the Zarnowiec nuclear power plant will allow a reduction in coal consumption by about 3 million tons annually--not to mention the conservation of the natural environment or the reduction of losses in transmitting energy for the operation of the pumped-storage electric power plant.

It is worthwhile stressing the fact that safeguard systems absorb about 30 per cent of the expenditures designated for constructing part of the nuclear plant. This encompasses design solutions and the plant location itself, which fulfills all the conditions set up by the International Atomic Energy Agency and Poland's regulations on X-ray protection, as well as the binding principles tested in practice with the USSR. These include applying the so-called three barrier system between the nuclear fuel in the reactor and the surrounding power plant area, as well as the double barrier system between the remaining radioactive materials. Furthermore, in all special compartments of the nuclear power plant a constant negative pressure will be maintained, shutting off the possibility of radioactive materials reaching the atmosphere. It is also customary to have a closed and completely airtight water circulation system in the reactor part of the nuclear plant.

The nuclear power plant at Zarnowiec will be built with the help and cooperation of the Soviet Union and other socialist countries. Supplying equipment to this nuclear plant is covered under a special CEMA agreement.

A major part of the equipment (over one-half), however, will come from our own industry, which should also fulfill a general supply function. We will produce a complete machine shop, a steam operating plant, a pressure stabilizer, heat exchangers, emergency power supply stations and transportation-technological equipment. Some of this equipment is already being supplied to other consignees by CEMA.

The Zarnowiec electric power plant is initiating a series of investments in the nuclear power industry. It is anticipated that the electric power plant "Kujawy" should be equipped with four power units of 1,000 megawatts each. It is also envisaged that by the year 2000 the total power of the nuclear power plants in Poland should be from 12,000 to 13,000 megawatts. Starting up these electric power plants would allow a savings of 130 to 180 million tons of hard coal from the years 1988 to 2000.

The need to maintain an energy balance speaks for a rapid as possible development of our nuclear power industry. The fact of the matter is that if in the long-run we want to overcome the growing fuel and energy problems, we have no other course than to reach out for nuclear energy. For many years this truth failed to reach the consciousness of persons responsible for economic decisions. It appeared that, having coal, we would be able to mine it unlimited quantities too. Earlier warnings by scientists and specialists-power engineers have been confirmed to the letter. In 1980, imports of fuel and energy exceeded exports for the first time.

At that time, the imbalance between the two was small. It amounted to only about 1 million tons (in units of so-called standard fuel). But in the following year it reached about 13 million tons. Of course, this may be explained by the sharp drop in mining and export of hard coal. It appears, however, that this is also the beginning of a deep-seated process with which, in the years to come, we will have struggle on a day-to-day basis.

One of the basic problems our government must cope with now under crisis conditions and in the future is satisfying the fuel needs of our country. Coal alone is not enough. We will have less of it than we had first anticipated; moreover, we must remember that coal is our chief export raw material. In turn, the very rationalization of an exclusively thriftless fuel-energy economy also does not help matters. Given these conditions, a nuclear power industry remains the only solution. We cannot make up for lost time--the first nuclear power units in Zarnowiec should be operating at this very moment--after all, one cannot waste anymore time.

Soviet-Polish Transmission Line

Warsaw TRYBUNA LUDU in Polish 20-21 Feb 82 pp 1, 4

[Communique by Leslaw Kolijewicz, issued in Moscow 19 Feb 80: "Beginning with the Second Half of the 5-Year Plan--Electrical Energy for Poland from the Chmel'nitskiy Nuclear Power Plant"]

[Text] (PAP) PAP correspondent Leslaw Kolijewicz informs us that on 19 Feb 1980, Poland's Foreign Trade Agency "ELEKTRIM" signed a contract in Moscow with the agency "TECHNOPROMEKSPORT" for supplying Soviet equipment and high-tension apparatus for building a transmission line of a voltage of 700 kilowatts from our state border to the city of Rzeszow.

The building of this line is connected with the international agreement on Poland's share in the construction of the Chmel'nitskiy nuclear power plant. As a result of this agreement we will receive electrical energy from the Soviet Union for at least 30 years.

This matter is of vital concern--beginning with the second half of the 5-Year Plan, we will receive 6 billion kilowatt hours of electrical energy annually, i.e., the kilowatt hours produced by a large power plant with a power of 1200 megawatts.

In order to build a transmission line from our state border to Rzeszow, the Soviet Union is supplying indispensable items: Substations, insulators, measuring instruments, switches and other equipment not produced by Polish industry. The building of the 700 kilowatt line itself was designed and will be implemented by Polish enterprises in accordance with Poland's norms for protecting the environment. Thus we are the third country in Europe--after the USSR and Hungary--which has applied in its own system such high voltages for long-distance transmission of electrical energy.

This transmission line will also serve in transmitting energy to Hungary, Czechoslovakia and the GDR. These countries have participated in the building costs for the Polish segment of the transmission line and the distribution station. In this way integrated programs of cooperation between socialist countries in the energy supply sector are also being implemented.

In speaking of supplying energy, one should also recall another contract signed in Moscow by "ELEKTRIM" and the Soviet agency "ENERGOMASZEKSPORT" for supplying the Bialystok region with 300 million kilowatt-hours of electrical energy from the Soviet Union this year.

PROGRESS IN NUCLEAR PROGRAM CONTINUES UNDETERRED BY EVENTS

Buenos Aires ENERGEIA in Spanish May 82 No 24, p 580

[Article by Martin F. Yriart: "The Nuclear Plan: Benefits From Self-sufficiency"]

[Text] The national policy of self-sufficiency in regard to nuclear power--the origins of which can be traced back beyond the awarding of Atucha I to Siemens--is a policy which led Argentina to adopt a family of reactors which use natural uranium and heavy water. This policy has passed through various stages, each one of them representing an advance in the whole process. None of these stages has lacked critics, well-intentioned and otherwise.

"We must give honor where it is due." Three years ago the National Atomic Energy Commission (CNEA) made the decision (later carried out through ENACE) to subsidize national private industry. This was done so that private industry would reach a sufficiently high level to allow it to participate in the manufacture of heavy components of the MZFR type (although this does not mean that the equipment is on hand at the present time). At any rate, we expressed doubts at that time, fearing that a protectionism policy for one sector of an economy which was in the process of opening up would have a doubly negative result; namely, for that sector in particular and for the economy in general.

Events of the month of April, a month which will remain indelibly engraved in the history of our country, have dispelled these doubts and have led us to believe that on the whole it is better to be alone than in bad company.

Nuclear self-sufficiency, even at the cost of greater investments, still more prolonged target dates, and the necessity to re-invent the umbrella, has proved to be a beneficial policy in the face of the coercive measures adopted by Great Britain and her allies in the present circumstances.

The list of countries which at the present time are providing technology, equipment, and supplies for the Argentine nuclear plan is not short. It extends from Brazil to Japan, passing through Canada, [West] Germany, Austria, and Switzerland, to designate only the best known. And recently it has included the Soviet Union. From this list the United States is missing and, circumstances notwithstanding, we should be conducting an appraisal of our natural allies in the region. Our historical encounters with the nation which was the cradle of democracy and the republican, representative, federal system as it is known and practiced in the contemporary world never cease to perplex us.

Following the Non-Proliferation Treaty of 1978 [sic], the United States applied the most rigid embargo in regard to cooperation and exchange between the nuclear camp and Argentina. These measures were barely softened by a few "friendly" gestures such as desisting from obvious obstruction tactics in the international sphere and such as collaboration in programs like the development of enriched low-grade fuel for experimental reactors (this latter measure basically helping to consolidate the North American policy in regard to exportation of enriched uranium). However, at the risk of sounding like a descendant of Sancho Panza, "strike while the iron is hot; do well and dread no shame; don't look at a gift horse in the mouth; etc."

The Prime Minister of Canada, Mr Pierre Trudeau, several days ago rejected a motion presented in the Parliament at Ottawa calling for the 70 professional and technical personnel now working at Embalse to be recalled. This rejection cannot be taken as the final word nor can one discount the pressures which Canada will feel in the coming weeks.

The few people who were able to see the "documentary" (almost three-quarters of an hour long) which was put together by BBC 2 on "Germany and the Argentine Atomic Bomb" and also the subsequent replies made by the Federal Republic's spokesman both on BBC and on Deutsche Welle [German television] not only appreciated Great Britain's tactical error in trying to "pressure" the Germans into withdrawing their support to the Argentine nuclear plan but also appreciated that an exactly opposite effect was achieved. This effect resulted from the definitive declarations of Mr Ruehl who in essence stated that Argentine-German cooperation in regard to nuclear energy is developing toward exclusively peaceful ends within the terms of international agreements to which the two countries are parties and under the supervision of the International Atomic Energy Agency.

The alarms sounded by Robin Denselow and David Taylor, respectively the director and producer of the BBC program, were nullified by the statements of Mr Ruehl; by those of Franz Josef Strauss, German Nuclear Energy Minister during the pertinent period; and even by those of Walter Schnurr, Director of the Nuclear Research Center, Karlsruhe, who was in charge of the Argentine-German program of nuclear cooperation in the decade of the 60's. The phantom of an Argentine atomic bomb behaves like a much more primitive weapon. Like a boomerang, to be precise.

Despite such unfounded allegations added to the difficulties the whole country was suffering prior to 2 April, the Argentine nuclear policy continues to bear fruit.

A decisive step has been taken in starting the experimental operation of the high-pressure circuit at Ezeiza, which although not yet officially inaugurated, is already in a position to begin rendering service. It is hoped, moreover, that within a short time the operational parameters required for full-scale operation will be achieved. This will allow us to try out the critical components for nuclear power plants like pumps, valves, seals, heat exchangers, and fuel elements, among others. And this in turn will make it possible to license equipment for use by national industry.

Another freely advancing program is the development of the technology for fuel elements of the CANDY [Canada Deuterium Uranium] (SUCOEM) type. This development is being accomplished within the CNEA itself and includes the design of fuel elements and their testing, of the processes and procedures of construction and control, and of the manufacturing equipment.

The processes at the laboratory level were developed by the Centro Atomico Constituyentes [Atomic Center for Components] and later on the Nuclear Fuel Elements Factory (FECN) in Ezeiza began to install a production line with the capacity to produce 5,500 fuel elements annually. That is equal to approximately 100 metric tons of uranium. Fuel rods made by the CNEA are now being irradiated in Canada.

With this production line, which is operating below the level of a pilot plant at the present time, they have begun to make prototype fuel elements, 12 of which will be installed in the core of the Embalse power plant after it is put into operation as part of the testing plan. Subsequently they will make another 150 and then 1,500 (this number to be reached in 1984). Once this program is completed, the operation of this line will be transferred to the CONUAR [Nuclear Fuel Corporation] Company, a mixed FECN-operated enterprise wherein most of the capital stock is privately held.

Under normal operations they will make 30 fuel elements per day, which means more than 1,000 fuel rods daily plus welding 2,000 end caps.

The equipment for manufacturing the fuel must to a large extent be developed in our country because Canada, its sole owner, will not let us have it. The automatic equipment for welding the end caps, developed and patented in Argentina, is the third generation of machines created for this purpose in our country. They will make it possible to weld 72 fuel rods every 30 minutes (144 end caps) and will be put into operation next month.

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CSO: 5100/2177

ARGENTINA

BRIEFS

NUCLEAR POLICY OBJECTIVES--Santa Fe, 31 May (TELAM)--Rear Adm Carlos Castro Madero stated today that the Argentine nuclear policy meets and has met the national interest. He made this statement during a telephone interview by a local radio station on the occasion of Atomic Energy Day. The head of the National Atomic Energy Commission [CNEA] stated that one of the objectives of the policy is manufacturing our own fuels, so as not to depend on foreign countries or on their pressures such as is now occurring at other levels due to the belligerency. Questioned about the agreements recently signed with the USSR, he said that they affect the Argentine nuclear plan on a small scale, but they can be expanded as support or assistance from other countries for carrying out the plan is cut off. He added: Right now no measure has been taken in this regard. Regarding difficulties which may arise due to the belligerency and the atomic policy schedule Castro Madero stated that there are three known priorities: Finish the Embalse nuclear plant; build the heavy water plant; and continue the construction of Atucha II. He admitted that the situation is hard to predict, but he assured: We will make every effort to take charge of the new situation and try to meet the reported schedule of the Argentine nuclear plan. Questioned on whether the British aggression with nuclear submarines could make the Argentine position on peaceful use of nuclear energy change, Castro Madero was categorical: No, we are not going to change our position which is firmly founded. [Text] [PY312235 Buenos Aires TELAM in Spanish 1700 GMT 31 May 82]

CSO: 5100/2179

ELECTROBRAS REPORTS ON URANIUM RESERVES

PY072356 Paris AFP in Spanish 2139 GMT 7 Jun 82

[Text] Brasilia, 7 Jun (AFP)--The state-owned enterprise ELECTROBRAS [Brazilian Electric Power Companies, Inc] revealed here today that the Brazilian uranium reserves, which currently amount to 266,300 tons, allow for the installation of 27 nuclear plants of 1,300 megawatts each.

ELECTROBRAS, which made this disclosure on reporting on the plan for supplying electricity in Brazil up to the year 2,000, said that the 1,300 - megawatt reactors can last for approximately 30 years if operated at 70 percent capacity.

Although the above plan provides for the installation of 27 nuclear plants, only the eight plants which are provided for in the German-Brazilian nuclear agreement signed in 1975 will be built.

The first two plants provided for in the German-Brazilian agreement, which have a power of 1,300 megawatts each, are being built in the city of Agra Dos Reis, located approximately 250 km south of Rio de Janeiro, next to the Angra I plant, which is the first Brazilian nuclear plant built with U.S. technology by the Westinghouse Corporation.

CSO: 5100/2183

TEXT OF NUCLEBRAS ANNUAL REPORT FOR 1981

Brasilia CORREIO BRAZILIENSE in Portuguese 16 Apr 82 pp 10-12

[Text] Brazilian Nuclear Corporation (NUCLEBRAS)

Annual report of the executive board for fiscal year 1981.

The executive board of the Brazilian Nuclear Corporation (NUCLEBRAS) presents to its stockholders the results of the activities carried out by the corporation in 1981.

NUCLEBRAS, established on 16 December 1974 by Law No 6,189, completed its seventh year of activity in 1981.

The past fiscal year was marked by the intensification of construction work on the industrial facilities of the NUCLEBRAS Group as well as by the positive results achieved in the area of uranium prospecting and exploration.

The activities within the framework of the nuclear agreement signed with the Federal Republic of Germany proceeded normally.

1. Fiscal year 1981 was marked by the beginning of management activities of the Angra-2 and -3 projects by the NUCLEBRAS Nuclear Power Station Construction Corporation (NUCON), followed by the signing of the NUCON-FURNAS contract for construction of those plants.

In the Resende Industrial Complex, construction and commissioning of the first stage of the fuel elements factory and the civil works of the first cascade of the enrichment plant were concluded.

In the mining-industrial sector, the uranium reserves in Itataia and Lagoa Real were increased by 30,000 tons, and preproduction of uranium concentrate was begun in Pocos de Caldas.

Construction of the pressure vessel for the Argentine Atucha-II reactor was also begun by the NUCLEBRAS Heavy Equipment Corporation (NUCLEP).

2. Activities in the Area of the Fuel Cycle

2.1 Mineral Prospecting and Exploration

During the year 1981, NUCLEBRAS conducted 43 mineral prospecting and exploration projects, distributed throughout the Brazilian territory.

In the implementation of those projects, the following work was carried out:

Geologic Surveying	57,947 square kilometers
Geologic Mapping	750 " "
Analysis and Interpretation of Aerogeophysics	231,500 " "
Geologic Probing	8,464 meters
Probing of Cubic Content	42,204 "
Profiling	53,065 "
Analytical Determinations	108,604 "

As a result of the activities carried out in this sector, Brazilian uranium reserves increased from 236,300 tons to 266,300 tons of U_3O_8 .

Geologic Reserves of Uranium in Metric Tons of U_3O_8

NUCLEBRAS	Type of Reserve					
	1980			1981		
	Measured and Indicated	Inferred	Total	Measured and Indicated	Inferred	Total
Pocos de Caldas plateau/ Minas Gerais	20,000	6,800	26,800	20,000	6,800	26,600
Figueira/Parana	7,000	1,000	8,000	7,000	1,000	8,000
Iron-bearing Quadri-lateral/Minas Gerais	5,000	10,000	15,000	5,000	10,000	15,000
Amorinopolis/Goias	2,000	3,000	5,000	2,000	3,000	6,000
Uranium-bearing territory of Rio Preto/Goias	500	500	1,000	500	500	1,000
Uranium-bearing territory of Itataia/Ceara	83,000	39,500	122,500	83,000	54,500	137,500
Uranium-bearing territory of Lagoa Real/Bahia	18,000	30,000	48,000	18,000	45,000	63,000
Espinharas/Paraiba	5,000	5,000	10,000	5,000	5,000	10,000
Total	140,500	95,800	236,300	140,500	125,800	266,300

2.2 Mining and Beneficiation of Uranium Ore

2.2.1 Mining-Industrial Complex of Pocos de Caldas Plateau

The most important event of the year 1981 with reference to activities connected with mining was the beginning of industrial preproduction of uranium concentrate for the first time in Brazil, which occurred at the Pocos de Caldas plateau mining-industrial complex.

Designed to produce 500 tons per year of yellow-cake, the plant of the Pocos de Caldas plateau mining-industrial complex will continue to operate in a preoperational phase for the first 4 months of next year, when it will then go into the industrial production phase properly speaking.

Organized into two large sectors (mine and beneficiation plant), the NUCLEBRAS Pocos de Caldas plateau mining-industrial complex processes 2,500 tons of ore a day and, in addition to the production of uranium concentrate already mentioned, it will also produce molybdenum and later zirconium, starting in 1983.

2.2.2 Itataia Project

The Itataia deposit in the municipality of Santa Quiteria in the state of Ceara, with reserves of 137,500 tons of U_3O_8 , is an occurrence of uranium in phosphated rocks, permitting the economic exploitation of uranium and phosphate at the same time.

In 1981, laboratory studies were completed to determine the process for the extraction of uranium and the utilization of the phosphoric acid, and preliminary planning was completed for exploitation of the deposit, which indicates the need to build a pilot plant with a nominal capacity of about 50 tons of uranium concentrate per year for optimization of the process determined in the laboratory.

2.3 Resende Industrial Complex

The fuel cycle activities pertaining to the phases of conversion, isotopic enrichment and manufacture of the fuel element are carried out at the Resende industrial complex in the state of Rio de Janeiro.

2.3.1 Conversion Plant

In 1981, in addition to the training program in the factories of the UPUK Group in France, the basic design of the plant was completed. The prequalification of Brazilian suppliers was begun with the aim of maximizing the percentage of national participation in the undertaking.

2.3.2 Isotopic Enrichment Plant

The uranium isotopic enrichment plant is being implemented in two phases by the NUCLEBRAS Isotopic Enrichment Corporation (NUCLEI), a NUCLEBRAS subsidiary. In the first phase, the first 24-stage cascade for the enrichment of uranium will be installed, with operational tests scheduled for 1984; its

civil works were completed in October 1981. In 1981 also, NUCLEI began the purchase of equipment produced nationally and abroad and the National Nuclear Energy Commission (CNEN) granted a license for installation of the equipment.

2.3.3 Fuel Elements Factory

The civil works for the first stage--the manufacture of the rods and the assembly of fuel elements--having been completed in 1980, the electromechanical equipment was installed in 1981, and the factory, which will go into operation in 1982, was commissioned.

2.4 Reprocessing Pilot Plant

Starting from the conceptual plan for the processing pilot plant concluded on the basis of a contract signed by NUCLEBRAS and KEWA/UHDE, in 1981 UHDE completed the basic design for the plant and began the detailed design, with the broad participation of NUCLEBRAS.

3. Activities in the Area of the Construction of Nuclear Power Stations

By Decree-Law No 1,810 of 23 October 1980, NUCLEBRAS received the exclusive right to build nuclear power stations. Until that date, with reference to the construction of nuclear electric plants, NUCLEBRAS participated only in the services of project engineering and the manufacture of heavy components. In 1981, on the basis of that decree-law, NUCLEBRAS established the subsidiary, NUCLEBRAS Nuclear Power Station Construction Corporation (NUCON), which began its activities that same year.

3.1 Angra-II and Angra-III

On 19 February 1981, the president of the republic, approving justifying Memorandum No 002/81, ordered the transfer to NUCON of responsibility for the construction, assembly, supplying and commissioning of Angra-II and Angra-III, formerly the responsibility of Furnas Electric Power Stations Corporation.

The transfer was carried out in two stages:

On 31 March 1981, Furnas and NUCON signed a protocol under which NUCON assumed the construction of the two nuclear power stations.

On 31 July 1981, Furnas signed two contracts with NUCON: one as overall contractor with the guarantee of a firm price and time period for construction of the two plants, delivering them "ready to operate"; and one for supplying the first charge of nuclear fuel for these plants.

On 30 July 1981, by Decree No 85,250, NUCLEBRAS was authorized to finance up to 100 percent of the construction of the nuclear plants, having signed contracts with Furnas for financing the construction of Angra-II and Angra-III, and for supplying the first fuel charges of those plants.

On 31 July 1981, NUCLEBRAS announced the opening of competitive bidding for the civil works of Angra-III; Angra-II will remain with the Norberto Odebrecht construction company.

On 15 September 1981, NUCON began work on the heading slab for the Angra-II foundation, which was completed on 11 November, when work on the foundation was completed.

In the fourth quarter of 1981, the process of prequalifying the civil construction companies for Angra-III and the electromechanical installation companies for Angra-II was begun.

NUCLEBRAS resumed and intensified the placement of orders in national industry to supply equipment for Angra-II and Angra-III.

3.2 Iguape-I and Iguape-II

In 1981, through the NUCLEBRAS Engineering Corporation (NUCLEN), NUCLEBRAS began the infrastructure work of the site and of preparation of the access roads to the two new plants, at the same time conducting hydrologic, geologic and topographic studies of the site.

3.3 Manufacture of Heavy Equipment

In 1981, the NUCLEBRAS Heavy Equipment Corporation (NUCLEP), located in the municipality of Itaquai-Rio de Janeiro, began the manufacture of the pressure vessel and the four steam generators for Iguape-I. It also began the manufacture of the pressure vessel for the Argentine Atucha-II nuclear power plant, as a subcontractor of the German KWU company, as well as the manufacture of the pressurizer for Angra-III, the latter being transferred from the scope of German supply responsibility to the national area.

Activities in the Area of the Production of Heavy Minerals

In the area of heavy minerals, the NUCLEBRAS Monazite and Associated Minerals Limited (NUCLEMON), established in April 1976, produced 2,034 kilograms of rare earths in 1981, in addition to compounds of thorium and uranium, as indicated below, with positive results in its balance:

Ilmenite	16,244 tons
Monazite	2,070 tons
Zirconite	4,760 tons
Compounds of sodium	8,185 tons

5. Activities in the Areas of Technology and Development

The activities of the NUCLEBRAS Group in the area of technological development are concentrated in the Nuclear Technology Development Center (CDTN) in Belo Horizonte and in the NUCLEBRAS associate in the Federal Republic of Germany, NUSTEP.

5.1 Nuclear Technology Development Center

In 1981, the CDTN directed its attention primarily toward training personnel and supporting the units of the NUCLEBRAS Group, the following activities being deserving of mention:

Analytical support for mineral prospecting and exploration activities.

Development of a process for the treatment of the ore from Itataia and Lagoa Real.

Performance tests of the dual deflection separation elements for the isotopic enrichment of uranium.

Lixiviation studies for the selection of national cements taking into account the incorporation of radioactive wastes.

Qualification in the techniques of welding stainless steel and special alloys.

Completion of the design and beginning of the purchase of circuit equipment for the tests of reactor components.

Development of data acquisition equipment for field operation in meteorology and environmental engineering, in the process of patent registration.

Development of codes for analysis of reactor safety, in cooperation with KWU.

Research in the use of thorium as a fuel in PWR reactors.

Basic activities for licensing the different units of the fuel cycle and nuclear power stations.

6. Activities in the Area of Industrial Certification and Personnel Training

The industrial promotion program, which has already qualified 350 national companies, enabling them to participate in the Brazilian nuclear program, has resulted in an appreciable increase in the percentage of nationalization of components for the nuclear plants.

With regard to training, specialization and advancement of personnel, from 1974 to 1981 NUCLEBRAS has provided training for 2,443 middle- and high-level technicians at home and abroad.

Under the sponsorship and supervision of NUCLEBRAS: 513 technicians completed courses in the area of nuclear technology through agreements with the Federal Universities of Rio de Janeiro (COPPE) and Minas Gerais.

The following chart gives the figures pertaining to the education and training of personnel in 1981.

Education and Training

At Home

No of participants

Specialization in nuclear technology	49
Quality control	48
Training in industry	269
Mineral prospecting and exploration	3

Abroad

Reactor engineering	15
Heavy components	1
Manufacture of fuel elements	1
Isotopic enrichment	8
Reprocessing	1
Nuclear protection and safety	3
Research and development	3
Mineral prospecting and exploration	2

7. Activities in the Social Area

NUCLEBRAS and its subsidiaries have a staff of 6,300 employees and its contractors employ 6,200 persons directly on behalf of the NUCLEBRAS Group.

Associated with the social benefits resulting from the creation of direct employment by the NUCLEBRAS Group, are the financial benefits for the municipalities in which industrial units are being installed, which furthermore benefit the Brazilian industrial park as a whole, with the gradual increase of the percentage of national participation of equipment.

With reference to the construction of nuclear power stations, the estimate of the number of jobs generated in the specific case of a 1,300 MW plant is:

Suppliers--direct	20,000	man/years
Suppliers--indirect	16,800	" "
Construction--installation	6,000	" "
Miscellaneous	6,000	" "
Total	48,800	" "

Continuing its activities, begun in September 1979, the NUCLEBRAS Social Security Institute (NUCLEOS) closed the year 1981 with reserves in the amount of 1,348,668 cruzeiros, showing an increase of 238 percent compared to the previous year, and the social security revenues collected during the past year increased 91 percent compared to the previous year.

The total number of members of NUCLEOS reached 3,584 as of 31 December 1981.

In addition to social security benefits, NUCLEOS, on behalf of the employees, administered supplementary health care, nutritional assistance, group life insurance, the agreement with the National Social Security Institute (INPS) for the employees of the NUCLEBRAS Group companies.

Explanatory Notes to the Financial Statements as of 31 December 1981

Note 1. Activities:

In addition to the activities of exploring and mining the deposits of nuclear ore and its associated elements and the gradual establishment in the country of the industrial park designed to complement the stages of the fuel element cycle, the company's charter also envisages as part of its corporate operations, corporate participation as well as administrative and financial support for the subsidiaries and associates.

With the advent of Decree-Law No 1,810, dated 23 October 1980, the company acquired the exclusive right to conduct studies, prepare projects and to build nuclear power stations and, consequently, in order to attend to those specific missions, the NUCLEBRAS subsidiary NUCLEBRAS Nuclear Power Station Construction Corporation (NUCON) was established by Decree 85,290 of 23 October 1980.

Decree 86,250, of 30 July 1981, which governs the furnishing of nuclear-electric plants, establishes that NUCLEBRAS will completely finance the plants that it furnishes directly or through its subsidiary, with the respective price being paid after the purchasing concessionaire has received the nuclear-electric unit ready to operate.

Article 49 of the aforementioned decree establishes that in the event that there are hydroelectric alternatives for the supplying of electric energy in the same amounts as the nuclear option, with an average installed kilowatt cost checked at the centers of consumption below the cost of the average installed kilowatt of nuclear origin with reference to the same point, payment of the respective price will be limited to the cost of the hydroelectric alternative. The hydroelectric alternatives referred to must be available at the level of basic design or, at the minimum, at the level of a feasibility study, of equivalent value, on the date of the decision to build the nuclear-electric plant.

As a result of the events referred to above, there was a significant inflow of funds necessary to the management of its operations derived from the attraction of financing abroad and the budget appropriations granted by the federal government.

Note 2. Summary of the Principal Accounting Practices

The principal accounting practices adopted by the company in the preparation and presentation of the financial statements are as follows:

System of Accounting of Transactions:

The double-entry bookkeeping system is adopted to record the changes in assets that have occurred during the fiscal year. The application of that system requires entering the revenues, costs and expenses at the time that they are acquired or incurred, therefore, independent of their actual receipt or payment.

The company is in a preoperational phase. In those circumstances, all costs and expenses incurred, as well as the revenues derived from activity of a contingent nature are being deferred for acknowledgment in the results of future fiscal years following the entry into normal operations.

Presentation of the Financial Statements:

The financial statements are prepared and presented in accordance with the provisions embodied in Law No 6,404/76, with the rules of Directive No 1 and Resolution No 8/80 of the Negotiable Securities Commission, and fiscal legislation.

Separation of Terms of Receivables and Payables:

The assets receivable and liabilities payable for terms up to 360 days are classified as circulating.

Acknowledgment of Inflationary Effects

The effects of inflation on the financial statements are acknowledged by entering the monetary correction on the permanent assets and the net assets based on the variations of the value of the ORTN. The net result of that correction is being deferred to be amortized at the time of the beginning of operations. The other assets and liabilities subject to correction or adjustment due to exchange variation are also corrected and, in the same manner, the respective net results are entered to the account of the deferred assets for amortization against the results of future fiscal years.

Evaluation Criteria

- a) The financial applications in open market securities are entered at the purchase cost plus the proportional yields received up to the date of the close of the fiscal year.
- b) The deposits in foreign currency--Central Bank (BACEN) Circular No 349--are adjusted to the buying exchange rate in effect on the date of the financial balance;
- c) The stocks are entered at the average purchase costs, which are less than the market prices or the net realized. Imports underway are entered at the cost incurred up to the date of the financial balance.
- d) The investments stemming from corporate participation in subsidiaries and the associate are evaluated by the asset equivalence method. The other investments are entered at the corrected cost.
- 3) The method of amortization of the agio pertaining to the investment in the associate--NUSTEP GmbH & Co Kg--will be determined in the future at the time of completion of the project that is now underway and in charge of the associate.

f) The fixed assets are entered at the corrected cost of purchase or construction. Depreciation is calculated by the linear method by the application of the rates that take into account the useful economic life of the assets.

g) The deferred assets are entered at the corrected cost.

Note 3. Loans to the Subsidiaries

	<u>Thousands of Cruzeiros</u>	
	1981	1980
NUCLEBRAS Mining Auxiliary Corporation NUCLAM	511,594	212,671
NUCLEBRAS Isotopic Enrichment Corporation NUCLEI	8,298,570	1,460,914
NUCLEBRAS Engineering Corporation NUCLEN	2,485,148	904,629
NUCLEBRAS Heavy Equipment Corporation NUCLEP	13,262,256	8,544,930
NUCLEBRAS Monzaita and Associated Minerals Corporation-NUCLEMON	38,305	--
	<u>24,595,873</u>	<u>11,123,144</u>

Financial charges are computed on the debit balances by the application of rates that vary between 3.74 and 8.25 percent per month depending on the dates on which the funds were released.

Note 4. Stocks

	<u>Thousands of Cruzeiros</u>	
	1981	1980
Raw materials	873	--
Indirect material--national	105,836	--
Indirect material--imported	378,867	--
Material being beneficiated abroad	3,642,702	--
Warehoused	286,489	13,332
Imports underway	97,306	--
	<u>4,512,073</u>	<u>13,332</u>

The material being beneficiated abroad is represented by the shipments made to URENCO Limited and Kraftwerk Union Aktiengesellschaft of 137,382.33 kilograms of uranium in the form of yellowcake (U₃O₈) and 306,320.0 kilograms of uranium converted into hexafluoride (UF₆) in the process of enrichment.

Note 5. Financing Granted--FURNAS Electric Power Stations Corporation

This is intended to totally finance the contracts for the overall contract work and for supplying the nuclear fuel for units 2 and 3 of the Almirante Alvaro Alberto Nuclear Power Station signed between Furnas Electric Power Stations Corporation and the NUCLEBRAS Nuclear Power Station Construction Corporation (NUCON) on 31 July 1981.

The financing granted yields semiannual and quarterly interest, respectively, calculated pro-rata-tempore on the debit balances corrected through the application of weighted average rates equivalent to the cost of acquisition of the funds (the portion of the funds of third parties), and to the rate of 12 percent per annum (the portion of its own funds).

The monetary correction is calculated on the debit balance and on the amortizations made through the application of average factors weighted by correction equivalent to the cost of acquisition of the funds (the portion of third parties), and by the variation of the value of the OETN (the portion of its own funds).

The balances will be amortized, respectively, in 20 semiannual installments and in 12 quarterly installments due consecutively 6 months after the date of acceptance and of taking possession of each of the units of the nuclear power station.

All the financing granted has been guaranteed by letters of guarantee signed by the Brazilian Electric Power Stations Corporation (ELETROBRAS) in the overall amount of 401,958,230,000, cruzeiros readjustable.

Note 6. Cost of Services and Equipment Underway

This is substantially represented by the expenses incurred in the stages of contracting and importing services and equipment at home and abroad intended for units 2 and 3 of the Almirante Alvaro Alberto Nuclear Power Station.

Note 7. Investments

	Thousands of Cruzeiros	
	1981	1980
Corporate participation in subsidiaries and outstanding in the associate	10,487,521	2,070,776
Minus portions to be integrated	--	175,760
	10,487,521	1,895,016
Agio in the associate	650,230	332,480
Other investments	39,438	20,165
	11,177,189	2,247,661

a) Opposition of Investments in the Subsidiaries and Outstanding in the Associate in 1981:
(in thousands of Cruzeiros)

	Percent of partici- pation	Net assets as of 12 Dec 81	Adjustment derived from variation of percent of partici- pation in the capi- tal of subsidiaries	Corrected investment	Asset equivalence adjustment	Asset value of investment
NUCLAM	51.0	360.233	--	183,718	(1)	183,718
NUCLEI	75.0	2,827,732	--	2,120,799	(2)	2,120,799
NUCLEN	75.0	(652,315)	--	--	--	--
NUCLEP	88.66	8,710,207	197,259	8,367,753	(842,543)	7,722,469
NUCLEMON	99.99	460,582	--	405,003	55,532	460,535
NUCOON	100.0	(173,307)	--	771,036	(771,036)	--
			197,259	11,848,309	(1,558,047)	10,487,521
NUSTEP GmbH & Co Kg	50.0	(137,913)	--	--	--	--
			197,259	11,848,309	(1,558.047)	10,487.521

(1) In preoperational phase
(2) In establishment phase

The financial statements of the subsidiaries and the associate were examined by independent auditors.

b) Additional Information

	<u>NUCLAM</u>	<u>NUCLEI</u>	<u>NUCLEN</u>	<u>NUCLEP</u>	<u>NUCLEMON</u>	<u>NUCON</u>	<u>NUSTEP</u>
Capital realized	302,354	1,411,188	89,741	8,225,000	340,485	500,000	5,672
No of shares or quotas held	154,200	1,058,391	67,306	7,292,285	340,451	500	576
Type of shares	ON	ON	ON	ON	Quotas	ON/OP	Quotas
Profit (loss) for fiscal year	(1)	(2)	289,456	(950,306)	55,538	(944,343)	(13,536)
Accounts receivable	11	--	--	--	46,446	--	--
Accounts payable	--	--	93,294	1,245,860	6,982	42,467,932	--
Loans granted	511,594	8,298,570	2,485,148	13,262,256	38,305	--	--
Advances for in- crease of capital	366,677	40,876	65,588	--	21,454	1,983,556	1,585,822
Revenues	407,671	3,551,118	1,426,511	10,841,052	29,884	277,083	607,248

(1) In preoperational phase

(2) In establishment phase

[ON-nominative common;
OP-bearer common]

Note 8. Fixed

(in thousands of Cruzeiros)

	1981		1980	
	Corrected cost	Corrected depreciation and amortization	Net value	Net value
Land	1,065,811	--	1,065,811	588,827
Buildings	232,695	55,431	177,264	75,317
Machinery and equipment	475,881	106,144	369,737	112,828
Facilities	105,413	35,435	69,978	35,210
Vehicles	98,287	54,587	43,700	10,549
Furniture and fixtures	359,041	105,521	253,520	79,770
Subtotal	2,337,128	357,118	1,980,010	902,501
Imports underway	85,106	--	85,106	7,628
Projects underway	24,548,093	--	24,548,093	7,113,867
Other fixed assets	4,912	--	4,912	2,257
Current fixed assets	3,492,819	--	3,492,819	3,004,962
Total	30,468,058	357,118	30,110,940	11,031,215

Note 9. Deferred

(in thousands of Cruzeiros)

	1981	1980
Expenditures in the uranium prospecting and exploration program	11,684,570	4,882,068
Expenditures in the development of the Pocos de Caldas deposit	15,117,352	4,727,291
Expenditures in obtaining technical information, consultation and training	8,779,226	1,574,946
Interests on loans and financing (minus active transactions)	13,704,782	5,465,079
Net monetary variations	30,469,272	12,936,004
Monetary correction of permanent assets and set assets	(24,431,073)	(7,752,324)
Improvements to assets of third parties (minus amortization: 84,135 cruzeiros in 1981 and 29,408 cruzeiros in 1980)	84,505	52,162
Income tax on inflationary profit	1,990,717	--
Other expenditures (net of revenues) to be amortized (minus amortization 113,744 cruzeiros in 1981 and 43,618 cruzeiros in 1980)	15,084,252	1,427,647
	<u>72,483,603</u>	<u>23,312,883</u>

Note 10. Subsidiaries

The balance is substantially represented by the advances made by the NUCLEBRAS subsidiary NUCON to be applied to the purchase and construction of equipment as well as the manufacturer of fuel elements intended for units 2 and 3 of the Almirante Alvaro Alberto Nuclear Power Station.

Note 11. Financing and Loans

	Thousands of Cruzeiros		Rate of	Last
	1981	1980	Charges	expira-
			(in percent)	tion
In National Currency				
Various institutions	10,891,721	9,220,384	55 - 126.7	1988
Minus short-term portion	(4,358,094)	(3,642,809)		
	<u>6,553,627</u>	<u>5,577,575</u>		
In Foreign Currency				
U.S. dollar: \$396,881,000 (1980: \$268,501,000)	50,721,561	17,586,827	0.875-1.875 above LIBOR*	1991
German Marks: DM 736,127,000 (1980: DM 166,122,000)	41,756,889	5,619,424	0.875-2.0 above LIBOR*	1991
French francs: FF 61,799,000 (1980: FF 15,370,000)	1,385,810	224,456	7.2 - 7.25 per annum	1989
Minus short-term portion	(5,419,531)	(1,845,459)		
	<u>88,444,729</u>	<u>21,585,248</u>		
	<u>94,978,356</u>	<u>27,162,823</u>		

*[LIBOR-London Interbank Offered Rate]

Guarantees:

The loans in foreign currency are guaranteed for the most part by endorsement of the Federative Republic of Brazil.

The national loans in their majority were made through the discounting of promissory notes.

The loans from the Machinery and Equipment Financing Fund (FINAME) are guaranteed by fiduciary conveyance of the equipment purchased with the loan funds.

For the loans from the Studies and Plans Financing Agency (FINEP), NUCLEBRAS offered as a guarantee the share of the Single Tax on Lubricants and Liquid and Gas Fuels allocated to it by the federal government.

Note 12. Capital

The subscribed and integrated capital is represented by 983,819,000 nominative common shares and 691,240,000 bearer common shares in the value of 2.45 each (1.62 cruzeiros in 1980)

Note 13. Subventions for Investments

These represent funds derived from the Single Tax on Lubricants and Liquid and Gas Fuels and from grants received from the International Atomic Energy Agency (IAEA) to be applied in research and development activities in nuclear minerals and nuclear technology and in establishing nuclear fuel cycle units.

Note 14. Federal Credits for Increase of Capital

These represent credits derived from budgetary appropriations and supplements to reinforce budgetary appropriations granted by the Ministry of Mines and Energy through agreements and decrees of the federal government.

Because they represent credits specifically intended for the participation of the federal government in the capital of NUCLEBRAS, they were classified separately in the financial statement and corrected monetarily. The value of the monetary correction is added to the account of subventions for investments in the subgroup of capital reserves.

Statement of Sources and Applications of Funds (in thousands of cruzeiros)

<u>Sources</u>	<u>Fiscal Year ending 31 December</u>	
	<u>1981</u>	<u>1980</u>
From Stockholders		
Advances for future increase of capital	38,910,000	1,593,850
From Third Parties		
Financing	37,735,295	10,184,227
Subventions for investment	333,759	2,739,665
Funds for the formation of nuclear stocks (Law 5,876/73)	154,351	390,058
Credits of subsidiaries and associate	2,510,807	--
Suppliers abroad	<u>3,093,342</u>	<u>--</u>
	<u>82,737,554</u>	<u>14,907,800</u>

[continued]

[Continuation of Note 14]

Applications	Fiscal Year ending 31 December	
	1981	1980
In Permanent Assets		
Purchases of fixed assets	7,875,671	4,026,032
Increase of deferred assets	29,010,681	7,758,615
Increase of investments	7,340,757	--
For Other Purposes		
Increase of advances to the associate for future increase of capital	1,848,217	199,596
Increase of financing to the subsidiaries and associate	--	2,648,419
Debtors by financing--third parties	53,881,982	--
Transfers to short-term or long-term loans and financing	7,329,544	2,047,043
Increase of other long-term receivables	741,602	4,173
	108,028,454	16,683,878
Reduction of net circulating capital	(25,290,900)	(1,776,078)

Represented by:

	Balances on		Reduction		Variation for
	31 Dec 81	31 Dec 80	31 Dec 79	31 Dec 81	31 Dec 80
Circulating assets	35,432,465	4,682,947	1,715,254	30,749,518	2,967,693
Circulating liabilities	64,486,922 (29,054,457)	8,446,504 (3,763,557)	3,702,733 (1,987,479)	56,040,418 (25,290,900)	4,743,771 (1,776,078)

The explanatory notes are an integral part of the financial statements.

Report of the Fiscal Board

The fiscal board of the Brazilian Nuclear Corporation (NUCLEBRAS), through its undersigned regular members Colombo Machado Salles, Paulo Cabral de Araujo, and alternate member Roberto Goncalves de Toledo, in compliance with the legal provisions governing stock companies in Brazil, has examined the financial statements, the explanatory notes and the annual report of the executive board on the business activities of the corporation. It has also studied the proposal to be submitted for deliberation at the next regular general assembly, to put into effect the capitalization of the capital reserve formed as of the closing balance of the corporate fiscal year 1981 and resulting from the

monetary correction of the Capital Received, as well as from the correction of the Authorized Capital, at the same rates, in accordance with the provisions of Articles 167 and 168, Paragraph 29 of Law 6404/76, respectively; as a consequence of which the following modifications are effected: the par value of shares, from 2.44 to 4.78 cruzeiros; the subscribed and integrated capital, from 4,102,258,957.00 to 8,006,778,913.00 cruzeiros; the authorized capital, from 12,094,137,560.00 to 23,692,613,744.00, corresponding to 2,973,968,252 common shares and 1,982,645,502 preferred shares.

Having received from the administration all of the information and explanations necessary for the performance of its legal and statutory mission, the fiscal board is of the opinion that the accounts, the financial statements, and the respective explanatory notes and annual report are in condition to merit approval and declare, further, that the aforementioned proposal is in accord with pertinent legislation and with the corporate statute and therefore in condition to merit the approval of the regular general assembly of stockholders of the corporation.

Dated: 7 April 1982

/s/	/s/	/s/
Colombo Machado Salles	Paulo Cabral de Araujo	Roberto Goncalves de Toledo

Paulo Nogueiro Batista, president, CPF 075,071,194-91
Jose Pinto de Araujo Rabello, director, CPF 290,227,387-87
Ney Freire de Oliveira Junior, director, CPF 006,428,788-20
Ilmar Penna Marinho Junior, director, CPF 021,253,317-72
Carlos Thadeu de Freitas Gomes, director, CPF 036,473,587-20
Jose Berthoux Tavares, accountant, CRC-RJ 014,347-9-S-DF 349, CPF 024,180,357-15

Financial Statement
(in thousands of cruzeiros)

Assets

	As of 31 December	
	<u>1981</u>	<u>1980</u>
Circulating		
Cash and banks	8,028,095	220,840
Financial applications	1,609,040	122,891
Accounts receivable	78,220	88,140
Costs of services and equipment underway	12,879,711	1,069,808
Deposits in foreign currency		
Circular No 349-BACEN	1,151,306	2,934,656
Other credits	7,110,205	233,280
Stocks	4,512,073	13,332
Expenses of following fiscal year	<u>63,815</u>	<u>--</u>
	<u>35,432,465</u>	<u>4,682,947</u>
Long-Term Receivable		
Loans to subsidiaries	24,595,873	11,123,144
Advances to subsidiaries and associate for increase of capital	4,063,973	1,124,506
Financing granted-		
FURNAS Electric Power Stations Corporation	76,362,518	--
Other credits	<u>790,800</u>	<u>49,198</u>
	<u>105,813,164</u>	<u>12,296,848</u>
Permanent		
Investments	11,177,189	2,247,661
Fixed	30,110,940	11,031,215
Deferred	<u>72,483,603</u>	<u>23,312,883</u>
	<u>113,771,732</u>	<u>36,591,759</u>
	<u>255,017,361</u>	<u>53,571,554</u>

The explanatory notes are an integral part of the
financial statement

Financial Statement
(in thousands of cruzeiros)

Liabilities	As of 31 December	
	<u>1981</u>	<u>1980</u>
Circulating		
Suppliers (includes accounts with subsidiaries: 1981 111,208 cruzeiros and 1980 7,461 cruzeiros)	9,892,770	2,530,682
Financing and loans	9,777,625	5,488,268
Subsidiaries	43,814,068	--
Other payables (includes accounts with subsidiaries 1981: 197,599 cruzeiros)	<u>1,002,459</u>	<u>427,554</u>
	<u>64,486,922</u>	<u>8,446,504</u>
Long-Term Payable		
Suppliers	3,093,342	--
Financing and loans	94,978,356	27,162,823
Provision for income tax	1,982,157	--
Other payables (includes accounts with subsidiaries 1981: 711 cruzeiros)	<u>3,536,783</u>	<u>599,622</u>
	<u>103,590,638</u>	<u>27,762,445</u>
Net Assets		
Authorized capital	12,094,137	8,021,049
Minus capital to be subscribed	<u>7,991,879</u>	<u>5,300,277</u>
Subscribed and integrated capital	4,102,258	2,720,722
Capital reserves	41,133,185	11,965,999
Profit reserves	149,915	76,655
Accrued profits	<u>92,627</u>	<u>47,363</u>
Federal Credit To Increase Capital	<u>45,477,985</u>	<u>14,810,789</u>
Federal credit to increase capital	<u>41,461,816</u>	<u>2,551,816</u>
	<u>255,017,361</u>	<u>53,571,554</u>

The explanatory notes are an integral part of the
financial statements.

Statement of Changes in Net Assets
(in thousands of cruzeiros)

	Capital Reserves					Profit Reserves				
	Capital	Monetary correction of capital	Other monetary corrections	Subventions for investments	Legal	Development of the nuclear technology	Special from investments in subsidiaries & associate	Accumulated profits	Total	
Balances as of 31 Dec 79	1,842,564	1,333,471	881,351	3,482,706	4,079	4,013	42,749	31,413	7,422,346	
Adjustment of previous FY	--	(255,263)	--	--	--	--	--	--	(255,263)	
Funds and subventions received	--	--	--	2,727,013	--	--	--	--	2,727,013	
Increase of capital	878,208	(878,208)	--	--	--	--	--	--	--	
Monetary correction	--	1,381,486	447,513	3,045,930	2,071	2,037	21,706	15,950	4,916,693	
Balances as of 31 Dec 80	2,720,772	1,381,486	1,328,864	9,255,649	6,150	6,050	64,455	47,363	14,810,789	
Funds and subventions received	--	--	--	333,759	--	--	--	--	333,759	
Increase of capital	1,381,486	(1,381,486)	--	--	--	--	--	--	--	
Monetary correction	--	3,920,510	1,269,989	25,024,414 ¹	5,878	5,782	61,600	45,264	30,333,437	
Balances as of 31 Dec 81	4,102,258	3,920,510	2,598,853	34,613,822	12,028	11,832	126,055	92,627	45,477,985	

1. See Note 14

The explanatory notes are an integral part of the financial statement

Auditors' Report

Honorable Directors of the
Brazilian Nuclear Corporation (NUCLEBRAS)

1. We have examined the statements of assets and liabilities of the Brazilian Nuclear Corporation (NUCLEBRAS) as of 31 December 1981 and the respective statements of changes in net assets and of the sources and applications of funds for the fiscal year ending on that date. Our examinations were made in accordance with generally accepted auditing standards and, accordingly, included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

2. Previously, we examined and issued our report on the financial statements for the fiscal year ending 31 December 1980, the figures of which are presented for purposes of comparison.

3. In our opinion, the financial statements referred to in the first paragraph fairly represent the assets and financial position of the Brazilian Nuclear Corporation (NUCLEBRAS) as of 31 December 1981, the changes in its net assets and the sources and applications of its funds for the fiscal year ending on that date, all in conformity with generally accepted accounting principles applied on a basis consistent with the previous fiscal year.

Rio de Janeiro, 2 April 1982
Boucínhas, Campos & Claro S/C
CRC. SP -5,528-S - RJ

Sergio Brilhante de Albuquerque; Accountant - CRC-RJ-18064-2

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CSO: 5100/2169

ESCOM CHIEF CRITICIZES U.S. FOR BREAKING URANIUM CONTRACT

Johannesburg RAND DAILY MAIL 18 May 82 p 13

[Article by Adam Payne]

[Text]

A STRONG attack on the US Department of Energy (DOE) for breaking its contract to supply enriched uranium to Escom for Koeberg was made by Mr Jan Smith, chairman of Escom, in an interview with Mr Rob Laufer, editor of Nucleonics Week, published in New York by McGraw-Hill.

Mr Smith said: "Why should we be subject to deliberations between Washington and Pretoria? It's almost blackmail, isn't it? Why should a commercial agreement between DOE and Escom be subject to political considerations? The Nonproliferation Act has a lot of merit, but Koeberg is not going to proliferate."

Mr Smith said that if Escom had known in 1976 all the fuss that would come over Koeberg, he doubted whether Escom would have gone to the trouble of a nuclear plant.

The "fuss" revolves around Escom's efforts to secure enriched uranium for Koeberg — first through a long-standing contract with DOE, and then on the world market.

Mr Laufer quotes sources outside Escom as saying that efforts to secure fuel were begun as much as four years ago when it became clear that the US would not fulfill the contract Escom signed

with DOE, unless South Africa signed the Nonproliferation Treaty and agreed to full-scope safeguards.

"I understand the US Government's position in not breaking the law but they have to understand us, too," said Mr Smith. "Escom had an agreement with DOE, not anyone else. We are not amused by someone not fulfilling a contract. This is the first time this has happened to us."

Mr Smith portrayed Escom as an apolitical entity interested solely in generating electricity.

Looking ahead, he said there was no indication that DOE was working towards a solution.

He called the purchase of enriched uranium from Switzerland's Kaiseraugst consortium and possibly another European entity a "temporary expedient".

"The French (fabricated fuel) will see us through for a certain period of time; after that we do not know what we will do... one thing is certain: we can't let a thing of 2-million kw stand idle."

Mr Smith said: "The post-first core gives us problems, and it's there that we seem to be getting no help from the US. If they don't intend to honour the contract they should say so."

Mr Smith also asserted that "nuclear fuel is all over the world, it's easy to get"

As for supply from the Uranium Enrichment Corporation of South Africa (Ucor) which is building a small commercial plant due for completion no sooner than 1987, Mr Smith said that Ucor is not an automatic supply and that it will have to submit a tender like any other enricher.

Escom will not need another nuclear power station until the mid-1990s and when another station is decided on a longer lead time than the 78 months for Koeberg will be allowed. Mr Smith made this clear in the interview.

On the possibility of another nuclear power station, he said Escom is busy with an analysis on which will be based the organisation's nuclear plans for the rest of the century.

Mr Laufer comments that Escom itself is no more than lukewarm towards additional plants and completely rules out any large programme.

Escom's present capacity is 20 000 Mw, with 70 000 Mw projected by the end of the century.

Escom's analysis will come to conclusions on the best ways to reach 70 000 Mw. It is scheduled to be completed in about 18 months and will consider the establishment of another nuclear station in the southern part of the country — away from the coal fields.

SOUTH AFRICA

BRIEFS

NUCLEAR WASTE DISPOSAL--Cape Town--There was no safe and effective method of disposing of the nuclear waste that would come from Koeberg annually, a University of Cape Town Academic said. Associate Professor Arnold Abromowitz of the Department of Psychology and acting chairman of Koeberg Alert said that among several major concerns with the development of the nuclear industry was the lack of adequate disposal. "At present there is not a single demonstrated safe and effective disposal method for such nuclear wastes in the world." An objective indicator of the status of the nuclear industry in the United States was the refusal by insurance companies to underwrite insurance against nuclear accidents. Professor Abromowitz said Koeberg was here to stay but what should concern every citizen was the emergency plan that Escom was obliged to produce and which was expected soon. [Text] [Johannesburg THE STAR in English 17 May 82 p 2]

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June 28, 1982